Loan loss provisioning, bank credit and the real economy ☆

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A R T I C L E   I N F O

A B S T R A C T

This paper examines how credit risk affects bank lending and the business cycle. We estimate a panel Vector Autoregression model for an unbalanced sample of 12 OECD countries over the past two to three decades, consisting of the output gap, inflation, the short-term interest rate, bank lending, as well as loan loss provisioning by banks (as proxy for credit risk). Our main findings are that: (i) bank lending and loan loss provisioning are important drivers of business cycle fluctuations, (ii) loan loss provisioning decreases in relative terms as bank lending increases, and (iii) bank lending is primarily affected by output fluctuations.

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1. Introduction

The recent financial crisis has shown that bank credit is an important determinant of business cycle fluctuations. Before the crisis, bank credit was abundant (Adrian and Shin, 2009), boosting economic growth. During the crisis, credit default risk, i.e., the risk that a borrower is unable to pay back a bank loan, increased, restraining the issuance of new bank loans.

In this paper we examine how credit default risk affects bank lending and the business cycle. As a measure of credit default risk, we use loan loss provisioning by banks. While most of the literature on loan loss provisioning examines its determinants, we are especially interested in how loan loss provisioning affects credit and the real economy. Until now the effect of loan loss provisioning on the real economy only received limited attention in the literature. Furthermore, most previous studies use bank-level data instead of macro data.

Bank loan loss provisioning may be either procyclical or countercyclical, depending on whether provisioning is backward-looking (sometimes called 'non-discretionary') or forward-looking ('discretionary'). Backward-looking provisioning relates provisioning to the occurrence of problem loans. This has as potential drawback that expected credit losses are underprovisioned during upswings, when few problem loans are identified and hence the level of provisioning is low. Conversely, during downturns provisioning increases because credit defaults are high. As a result, backward-looking

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provisioning is procyclical.[1] In contrast, forward-looking provisioning is countercyclical. Banks estimate their expected credit losses over the business cycle and build up provisions during upswings and draw down on them during downturns.

Accounting rules contribute to backward looking provisioning, as they tend to allow provisions based on past events, not on expectations (Borio and Lowe, 2001). International Financial Reporting Standards (IFRS) utilize a so-called 'incurred loss model' where loan losses are recognized only after loss events have occurred prior to the reporting date that are likely to result in future non-payment of loans. This is the so-called International Accounting Standard (IAS) 39 rule under IFRS. This rule does not allow for consideration of future expected losses based on trends suggestive of additional future losses (Bushman and Williams, 2012).

Most of the empirical finance literature confirms backward-looking provisioning. Bikker and Metzemakers (2005) find evidence of a negative relation between GDP growth and provisioning for 29 OECD countries, implying backward looking practices. This procyclicality is mitigated partly by the positive relation between banks' earnings and provisions, which might be due to either income smoothing or forward looking provisioning. Laeven and Majnoni (2003) also find evidence that banks around the world are less prudent during periods of rapid credit growth, in the sense that under favorable conditions banks postpone provisioning until unfavorable conditions set in. Bouvatier and Lepetit (2008) examine the impact of loan loss provisions on bank lending using a sample of 186 European banks for the period 1992–2004. They find that backward looking provisioning amplifies credit fluctuations, while forward looking provisioning or income smoothing does not. Empirical work by Jiménez et al. (2012), examining the impact of countercyclical capital buffers on credit supply using countercyclical 'dynamic' provisioning experiments in Spain, find that countercyclical capital buffers help smooth credit supply cycles.

The usefulness of loan loss provisioning for macroprudential regulation has recently also received attention in the theoretical literature. Bouvatier and Lepetit (2012), in a partial equilibrium framework, show that forward-looking provisions can eliminate procyclicality in lending standards induced by backward-looking provisions. Agénor and Zilberman (2013), in a calibrated DSGE model, show that forward-looking loan loss provisions can reduce volatility in financial and real variables by mitigating the changes in the stock of loan-loss reserves over the course of the business cycle. Zilberman and Tayler (2014) examine the interaction between loan loss provisioning rules, business cycle fluctuations and monetary policy in a DSGE model with endogenous credit risk. These authors highlight the importance of forward-looking provisions in mitigating welfare losses, as well as how accounting rules with respect to loan loss provisions alter the transmission mechanism of monetary policy.

For our analysis we set up a macroeconomic framework including a banking sector and credit default risk. The aim of our paper is not to establish a new theoretical framework, but to underpin our empirical panel VAR model with a theoretical framework. Therefore, we simplify an established theoretical framework to bring the model to the data. To keep the number of variables tractable, we use an industrial organization approach to model the banking sector (Freixas and Rochet, 2008). The representative bank maximizes its expected profits anticipating that a fraction of credit will default in the future (Greenbaum et al., 1989). We implicitly solve for the optimal levels of credit and the lending rate (i.e., the price of credit), given the short-term interest rate (the cost of credit) and credit default risk. The equilibrium conditions for credit and the lending rate are embedded in a standard closed-economy macroeconomic framework, as often used to analyze the monetary transmission mechanism (see e.g., Svensson, 1997 and Clarida et al., 1999). Hence, instead of assuming a perfect interest rate pass-through, credit risk and market power in the banking sector determine the interest rate spread (in line with Christiano et al. (2014) for the former and Berger et al. (2004) for the latter). The representative bank is exposed to credit risk which imposes a potential cost for the bank. Consequently, an increase in credit default risk increases the lending rate and decreases bank lending.

In order to assess whether the data support our theoretical model, we estimate a panel VAR for an unbalanced sample of 12 OECD countries over the last two or three decades (1980/1990–2008/9); the sample is determined by the availability of macroeconomic provisioning data.[2] Panel VARs can be used to uncover the dynamic relationships that are common to all cross-sectional units.[3]

Our panel VAR impulse response functions (IRFs) are generally in line with our theoretical model. First, the results suggest that credit risk (measured by provisioning by the banking sector) is one of the drivers of business cycle fluctuations. Specifically, an increase in provisioning decreases bank lending and economic activity. Second, it appears that banks decrease provisioning as a percentage of total bank assets when bank lending increases and vice versa. Hence, during upswings banks take on more risk by building up relatively low provisions while in downswings, banks build up loan loss provisions. These results confirm backward-looking provisioning. Third, output is an important determinant of bank lending, more so than other factors such as interest rates.

The remainder of the paper is structured as follows. Section 2 describes the theoretical model, Section 3 the data and Section 4 presents the results. Section 5 concludes.

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[1] Bolt et al. (2012), using aggregate bank data for an unbalanced set of 17 countries over the period 1979–2007, find that loan losses are the main driver of the negative impact of recessions on bank profits.

[2] After 2009 the OECD discontinued the publication of the Bank Profitability Statistics from which the macroeconomic provisioning data are taken.

[3] For example, Love and Zicchino (2006) study the impact of financial factors on firm investment and De Haan and Van den End (2013) examine banks' responses to market funding shocks. See Canova and Ciccarelli (2013) for a survey of the panel VAR literature.